

STAFF ANALYSIS OF PETITION TO AMEND THE HIGH DESERT POWER PROJECT ENERGY COMMISSION DECISION (97-AFC-1C)

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September 9, 2004

AMENDMENT REQUEST

On August 26, 2004, the High Desert Power Project, LLC (HDPP), filed a request to amend various air quality Conditions of Certification to enhance the facility's compliance ability during start-ups and shut downs. Specifically, HDPP requests the following modifications:

1. Eliminate the time duration limits of start-up episodes (AQ-29(b)),
2. Replace the individual turbine's emission limits with new limits for the entire power block, comprising three gas turbines and a steam turbine generator (AQ-29),
3. Revise oxides of sulfur (SO_x) emission limits by adding limits based on the higher heating value of natural gas fuel (AQ-28, AQ-30 and AQ-31),
4. Revise Conditions AQ-14, 16, 19, 25, and 26 to maintain consistency with Mojave Desert AQMD protocols and requirements of federal law.

HDPP proposes to maintain the facility daily and annual emission limits at the previously permitted level. Therefore, HDPP does not propose any additional mitigation.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The project's amendment is subject to the State, Federal and the District rules and regulations described in the Final Staff Assessment for the facility.

STAFF ANALYSIS

Staff's objectives in completing the air quality analysis for this amendment request are (1) to identify whether there is a potential for a significant air quality impact; and (2) to assure that appropriate mitigation measures have been applied to avoid or mitigate any identified potential air quality impacts.

1. Amendment to Condition of Certification AQ-29

The HDPP was licensed to allow either a three-turbine or two-turbine configuration. The facility was built using a three-turbine/one steam turbine configuration. After commissioning and operation, HDPP personnel realized that the facility start up sequence can take longer time than that specified in the current conditions of certification, even though the emissions are not higher than the limits in the conditions.

HDPP requests that the duration limits currently in Condition of Certification AQ-29(b) be deleted. Staff believes that condition of certification AQ-12, which requires that ammonia injection start when the selective catalytic reduction system (SCR) reaches 550°F, would ensure that excessive emissions would not occur as a result of intentional or unintentional prolonged start-up periods. Because the start-up and the daily emission limits would not be exceeded, staff does not object to deleting the start up time duration limits in Condition AQ-29(b).

Additionally, HDPP requests that the emission limits specified in Condition of Certification AQ-29 (c), (d), (e) and (f) be revised to apply to the total power block, rather than individual gas turbines, for easier compliance verification. The new emission limits, which are the sum of all three gas turbines' emissions, would not change the facility's air quality impacts that were estimated in the original Final Staff Assessment. Therefore, staff has no objection to the modification to AQ-29 (c), (d), (e) and (f).

2. Amendment to Conditions of Certification AQ-28, 30 and 31:

The Federal Title VI "Acid Rain" permit requires that SO_x emissions be reported using the higher heating value (HHV) of natural gas. The originally approved SO_x limits were based only on the lower heating value (LHV) of natural gas. Calculations based on LHV versus HHV differ due to technical considerations regarding how heat contained in the water vapor from combustion is included. The two approaches result in seemingly different emissions limits, but these are equivalent and no actual change in facility emissions is proposed or anticipated. Revision to Conditions AQ-28, 30 and 31 would show increases in SO_x emissions corresponding to the HHV calculations. However, the SO_x emission limits that were originally estimated using LHV values for natural gas will be retained; therefore, there would be no actual increase of SO_x emissions as the result of the amendment request to Conditions AQ-28, 30 and 31. Staff has no objection to this request. HDPP requests that ammonia slip emissions during start-up be exempt from the limit of 10 ppm that applies during normal operational periods. This request is consistent with staff's assumption used in the original Final Staff Assessment, therefore, staff does not have any objection to this request.

3. Amendment to Conditions of Certification AQ-14, 16, 19, 25, and 26:

HDPP requests administrative changes to Conditions of Certification AQ-14, 16, 19, 25, and 26 to reflect administrative changes in the Federal laws or regulations. Below is a brief description to the change of each condition of certification:

AQ-14: HDPP requests the deletion of the requirement for measurement of the stack gas flowrate by a continuous emission monitoring system. The stack gas flowrate is actually calculated from the fuel use and other stack conditions recorded from the continuous emission monitoring system. Staff believes that deletion of this requirement would bear no impact on the ability to enforce condition of certification AQ-14, thus staff has no objection with this HDPP request.

AQ-16 (a) and AQ19 (a), (b), (c) and (d): The Federal Environmental Protection Agency allows the use of alternative methods to measure NO_x, O₂ and CO. Thus,

HDPP requests that those alternative methods be inserted into conditions of certification AQ-16 and 19 to provide the facility flexibility. Staff has no objection to this request.

AQ-25 and 26: The Mojave Desert Air Quality Management District (District) approved an alternate test method to estimate PM10 emissions from the cooling tower. Originally, the District required that testing of the cooling tower's circulating water (AQ-25) be conducted on a weekly basis (AQ-26), and the results would be used to estimate the cooling tower emissions. The District approved an on-line conductivity meter in lieu of the weekly testing of the circulating water. Although the conductivity meter is not as precise as weekly testing, it is a cheaper alternative and it provides instant readings of the circulating water's hardness. These data allow HDPP to estimate the cooling tower PM10 emissions at any given time; therefore, it would enhance the enforceability of the conditions of certification. Staff supports HDPP's request to modify AQ-25 and AQ-26.

CONCLUSIONS AND RECOMMENDATIONS

The request to delete the time duration limits of start up, to combine emission limits to reflect the total of three turbines, to revise SO_x emissions limits and various modifications to other Conditions of Certification would result in no significant impacts to the environment. Therefore, no additional mitigation is required.

Staff recommends approval of the HDPP amendment request. Specifically, staff recommends revisions to the Conditions of Certifications AQ-14, AQ-16, AQ-19, AQ-25, AQ-26, AQ-28, AQ-29, AQ-30, and AQ-31. The specific revised Conditions of Certification are shown below with new text underlined and deleted text shown in strikeout format.

REVISED CONDITIONS OF CERTIFICATION

AQ-14 Emissions of NO_x, CO, O₂ and ammonia slip shall be monitored using a Continuous Emissions Monitoring System (CEMS). Turbine fuel consumption shall be monitored using a continuous monitoring system. ~~Stack gas flow rate shall be monitored using a Continuous Emission Rate Monitoring System (CERMS).~~ The project owner shall install, calibrate, maintain, and operate these monitoring systems according to an MDAQMD-approved monitoring plan and MDAQMD Rule 218, and shall be installed prior to initial equipment startup. Six (6) months prior to installation the operator shall submit a monitoring plan for MDAQMD review and approval.

Verification: Unchanged.

AQ-16 The project owner shall perform the following annual compliance tests in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the MDAQMD no later than six weeks prior to the expiration date of this permit. The following compliance tests are required:

- a. NO_x as NO₂ in ppmvd at 15% O₂ and lb/hr (measured per USEPA Reference Methods ~~7E~~, 19₁ and 20).
- b. VOC as CH₄ in ppmvd at 15% O₂ and lb/hr (measured per USEPA Reference Methods 25A and 18).
- c. SO_x as SO₂ in ppmvd at 15% O₂ and lb/hr.
- d. CO in ppmvd at 15% O₂ and lb/hr (measured per USEPA Reference Method 10).
- e. PM₁₀ in mg/m³ at 15% O₂ and lb/hr (measured per USEPA Reference Methods 5 and 202 or CARB Method 5).
- f. Flue gas flow rate in scfmd.
- g. Opacity (measured per USEPA reference Method 9).
- h. Ammonia slip in ppmvd at 15% O₂.

Verification: Unchanged.

AQ-19 Continuous monitoring systems shall meet the following acceptability testing requirements from 40 CFR 60 Appendix B:

- a. For NO_x, Performance Specification 2 or 40 CFR 75 requirements and procedures.
- b. For O₂, Performance Specification 3 or 40 CFR 75 requirements and procedures.
- c. For CO, Performance Specification 4 or 4a.
- d. ~~For stack gas flow rate, Performance Specification 6.~~
- e. For ammonia, a District approved procedure that is to be submitted by the project owner.

Verification: Unchanged.

AQ-25 The project owner shall ~~conduct all required cooling tower water quality tests~~ calculate PM₁₀ emissions in accordance with an MDAQMD-approved test and emissions calculation protocol. Thirty (30) days prior to the first such test the operator shall provide a written test and emissions calculation protocol for MDAQMD review and approval.

Verification: Unchanged.

AQ-26 The operator shall ~~perform weekly tests of the blow-down water quality. The operator shall maintain a log, which contains the date and result of each blow-down water quality test, and the resulting calculated~~ mass emission rates. This log shall be maintained on site for a minimum of five (5) years and shall be provided to MDAQMD personnel on request.

Verification: Unchanged.

AQ-28 Emissions from this equipment (including its associated duct burner) shall not exceed the following emission limits at any firing rate, except for CO, NO_x ~~and VOC₁~~ and ammonia slip during periods of startup, shutdown and malfunction:

- a. Hourly rates, computed every 15 minutes, verified by CEMS and annual compliance tests:
 - i. NO_x as NO₂ – 18.00 lb/hr (based on 2.5 ppmvd corrected to 15% O₂)

- ii. CO – 17.53 lb/hr (based on 4.0 ppmvd corrected to 15% O₂)
 - iii. Ammonia Slip – 10 ppmvd (corrected to 15% O₂)
- b. Hourly rates, verified by annual compliance tests or other compliance methods in the case of SO_x:
- i. VOC as CH₄ – 2.51 lb/hr (based on 1 ppmvd corrected to 15% O₂)
 - ii. SO_x as SO₂ – 1.11 lb/hr (based on LHV), 1.2 lb/hr (based on HHV) ~~0.00064 lb/MMBtu (lower heating value))~~
 - iii. PM₁₀ – 18.14 lb/hr

Verification: Unchanged.

AQ-29 Emissions of CO and NO_x from this equipment power block may exceed the limits contained in Condition AQ-28 during startup and shutdown periods as follows:

- a. Startup shall be defined as the period beginning with ignition and lasting until the equipment power block has reached operating permit limits. Cold startup means a startup when the ~~CTG power block~~ has not been in operation during the preceding 72 hours. Hot startup means a startup when the CTG power block has been in operation during the preceding 8 hours. Warm startup means a startup that is not a hot or cold startup. Shutdown shall be defined as the period beginning with the lowering of equipment power block from ~~base~~ normal operating load and lasting until fuel flow is completely off and combustion has ceased.
- ~~b. Transient conditions shall not exceed the following durations:~~
 - ~~i. Cold startup – 4.5 hours~~
 - ~~ii. Warm startup – 2.6 hours~~
 - ~~iii. Hot startup – 1.9 hours~~
 - ~~iv. Shutdown – 1 hour~~
- c. During a cold startup emissions shall not exceed the following, verified by CEMS:
 - i. NO_x – 549183 lb
 - ii. CO – 10,6233544 lb
- d. During a warm startup emissions shall not exceed the following, verified by CEMS:
 - i. NO_x – 504168 lb
 - ii. CO – 10,7883596 lb
- e. During a hot startup emissions shall not exceed the following, verified by CEMS:
 - i. NO_x – 414138 lb
 - ii. CO – 11,1873729 lb
- f. During a shutdown emissions shall not exceed the following, verified by CEMS:
 - i. NO_x – 29197 lb

- ii. CO – ~~717239~~ lb

Verification: Unchanged.

AQ-30 Emissions from ~~this equipment~~ **the power block**, including the duct burner, may not exceed the following emission limits, based on a calendar day summary:

- a. NO_x – 848 lb/day, verified by CEMS
- b. CO – 8072 lb/day, verified by CEMS
- c. VOC as CH₄ – 1448 lb/day, verified by compliance tests and hours of operation
- d. SO_x as SO₂ – 26.7 lb/day (LHV), 28.8 lb/day (HHV), verified by fuel sulfur content and fuel use data
- e. PM₁₀ – 435 lb/day, verified by compliance tests and hours of operation

Verification: Unchanged.

AQ-31 Emissions from this facility, including the cooling towers, may not exceed the following emission limits, based on a rolling 12 month summary:

- a. NO_x – 205 tons/year, verified by CEMS
- b. CO – 750 tons/year, verified by CEMS
- c. VOC as CH₄ – 129 tons/year, verified by compliance tests and hours of operation
- d. SO_x as SO₂ – 14 tons/year (LHV), 15.8 tons/year (HHV), verified by fuel sulfur content and fuel use data
- e. PM₁₀ – 233.2 tons/year, verified by compliance tests and hours of operation

Verification: Unchanged.